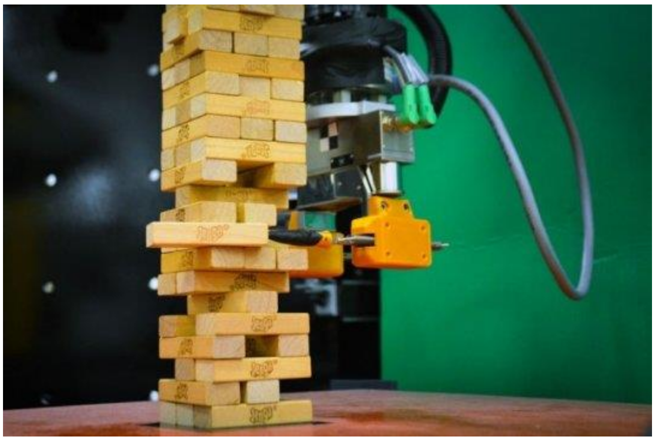
PRACTICE EXAM – 80 points

1. Reading Comprehension (10 points)

Read the following text and complete the tasks.

Robot combines vision and touch to learn the game of Jenga

Machine-learning approach could help robots assemble cellphones and other small parts in a manufacturing line



In the basement of the Massachusetts Institute of Technology's (MIT) Building 3, a robot is carefully contemplating its next move. It gently pokes at a tower of blocks, looking for the best block to extract without toppling the tower, in a solitary, slow-moving, yet surprisingly agile game of Jenga.

The robot, developed by MIT engineers, is equipped with a soft-pronged gripper, a force-sensing wrist cuff *(= Manschette)*, and an external camera, all of which it uses to see and feel the tower and its individual blocks.

As the robot carefully pushes against a block, a computer takes in visual and tactile feedback from its camera and cuff, and compares these measurements to moves that the robot previously made. It also considers the outcomes of those moves – specifically, whether a block, in a certain configuration and pushed with a certain amount of force, was successfully extracted or not. In real-time, the robot then "learns" whether to keep pushing or move to a new block, in order to keep the tower from falling.

Details of the Jenga-playing robot are published in the journal *Science Robotics*. Alberto Rodriguez, Assistant Professor in the Department of Mechanical Engineering at MIT, says the robot demonstrates something that's been tricky to attain in previous systems: the ability to quickly learn the best way to carry out a task, not just from visual cues, as it is commonly studied today, but also from tactile, physical interactions.

"Unlike in more purely cognitive tasks or games such as chess or Go, playing the game of Jenga also requires mastery of physical skills such as probing, pushing, and aligning pieces. You have to go and touch the tower to learn how and when to move blocks," Rodriguez says. "This is very difficult to simulate, so the robot has to learn in the real world, by interacting with the real Jenga tower. The key challenge is to learn from a relatively small number of experiments by exploiting common sense about objects and physics."

30 Rodriguez thinks the tactile learning system the researchers have developed can be used in applications beyond Jenga, especially in tasks that need careful physical interaction, including separating recyclable objects from landfill trash *(= Mülldeponien)* and assembling consumer products.

https://www.sciencedaily.com/releases/2019/01/190131101016.htm

Are the following statements based on the text true or false? Mark them clearly with T or F respectively. *(1pt for each)*

1. Jenga is not just a mostly cognitive game like chess or Go. _______

2. The robot decides which block to push simply by combining visual and tactile data. _______

3. This is the first robot that can quickly learn the best way to carry out a task. _______

4. The only way for this robot to learn how to play Jenga is by playing Jenga. _______

Answer these questions from the information in the text. Use your own words where possible.

5. What can this robot do which has been difficult to achieve with robots up to now? *(2 pts)*

____

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6. Explain the full set of data that the robot uses to 'learn' which block to push. *(2 pts)*

____

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7. What seems to be the aim behind teaching a robot to play Jenga? *(2 pts)*

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2. Verb forms (30 points)

Please complete both parts: 2(a) and 2(b)

2(a) Present Tense and Gerund (15 points)

The text below is a taken from a report made a few years ago about North Korea's own operating system.

FILL IN the correct form of the verb in brackets. Think about the meaning of the sentence in the context. You need the Present Simple (e.g. *uses, use*), Present Passive (e.g. *is used, are used, be used*) or the –ing form alone (e.g. *using*).

IT in North Korea

German computer experts have been taking a closer look at North Korea's own secret computer operating system, Red Star OS. Until now, not much has been known about it.

The Communist country ________________ (run) its own operating system – an altered version of Linux. It looks and feels like a normal operating system with all the apps and software. But Red Star OS ________________ (control) by the state. A closer look ________________ (show) that it uses technology that ________________ (allow) the authorities to spy on its citizens.

The system detects if a user wants to change things, then automatically ________________ (shut) down and ________________ (reboot). It also ________________ (have) special security features that ________________ (prevent) users from other countries from ________________ (hack) into it. Messages ________________ (encrypt) to guarantee safe transport. Files ________________ (carry) a watermark so that the government can see if and how users have changed them. Such security also ________________ (mean) that the authorities can find out who downloads pirated music and movies from the West.

North Korea has been working on its own operating system for years, in an effort to replace the ageing Windows XP, which many people still have installed. But nobody really ________________ (know) how many North Koreans are using Red Star OS.

The communist country ________________ (control) its citizens like no other state in the world. North Korea is isolated technologically from the rest of the world. There are no internet connections to the outside. Social media and other websites cannot ________________ (access) from within.

Word List

12	watermark	a special mark or sign on electronic documents for control purposes
13	pirated	illegal copies of software, music, movies, etc.

2(b) Past Tense (15 points)

This article was published in December 2018.

FILL IN the right form of the verb in brackets; you need Past Tense (e.g. *played)* or Past Passive (e.g. *was played, were played, be played*). Watch out for irregular verbs.

Dr Larry Roberts dies aged 81

American scientist Larry Roberts, who helped design and build the forerunner of the internet, has died aged 81.

In the late 1960s, he ________________ (run) a section of the US Advanced Research Projects Agency (Arpa), which ________________ (give) the job of creating a computer network called Arpanet. He also recruited engineers to build and test both the hardware and software that ________________ (require) to get the system running. Arpanet _______________ (pioneer) technologies underpinning the internet that are still used today.

Data design

Dr Roberts ________________ (always, consider) as one of the four founding fathers of the internet, along with Bob Kahn, Vint Cerf and Len Kleinrock.

The son of two chemists, Dr Roberts reportedly ________________ (choose) electronics as a field of study because it was more forward-looking. "I wanted something new, not old like chemistry," he told Katie Hafner in an interview with the New York Times.

Two key developments that ________________ (credit to = *zuschreiben*) Dr Roberts include: the layout of the original network and the way it ________________ (shuffle) data between its nodes. Dr Roberts ________________ (decide) on a distributed layout for the elements of the network, rather than a centralised system, and decreed *(=ordnete an)* that data should be split into small chunks or packets as it ________________ (travel) to its destination.

This packet-switching system, as it came to be known, ________________ (draw) on work done in the UK by Donald Davies at the National Physical Laboratory.

The first four computers ________________ (connect) to Arpanet in 1969 and it ________________ (grow) rapidly as universities and other research institutions joined it. Dr Roberts was also keen for Arpanet to be put to practical use and he encouraged early users to adopt email to improve communication and collaboration.

Arpanet ________________ (persist) until 1983 when it ________________(incorporate) into the larger internet and became one part of that network. After leaving Arpa, Dr Roberts had a distinguished career founding and then running a series of networking start-ups.

3. Reading comprehension and vocabulary – Gapped text (15 points)

The following passage is from a recent article about a security problem at Nasa in California. Before filling in the right words, read the whole passage to get the general meaning.

FILL each space with a word from the box. YOU can only use each word ONCE and can only score maximum points if every word is in its right place. The form of the words in the box does not need to be changed.

stolen systems gadget education breach
hack administrators restricted network weak
exploit data user vulnerable malicious

Raspberry Pi used to steal data from Nasa lab

The Jet Propulsion Lab is currently constructing the Mars 2020 rover

A tiny Raspberry Pi computer has been used to steal ________________ from Nasa's Jet Propulsion Laboratory, the space agency has revealed. An audit report reveals the ________________ was used to take about 500MB of data. It said two of the files that were taken dealt with the international transfer of ________________ military and space technology. The attacker who used the device to ________________ the network went undetected *(= unbemerkt)* for about 10 months.

Remote rover

The ________________ hacker won access to the Jet Propulsion Lab internal network via the Raspberry Pi by hijacking its ________________ account. Although the Pi had been attached to the network by the employee, lax *(= lasch)* controls over logging meant Nasa ________________ did not know it was present, said the report. This oversight left the ________________ device unmonitored on the network, allowing the attacker to take control of it and use it to steal data.

The Raspberry Pi is a credit-card sized computer that costs about $30 (£24). It has found a role in many computer ________________ initiatives and is also a popular choice for small-scale computing projects because it is tiny and easy to use.

Once the attacker had won access, they then moved around the internal network by taking advantage of ________________ internal security controls that should have made it impossible to jump between different departmental ________________ .

The attacker has not been identified or caught. The ________________ data came from 23 files, but little detail was given about the type of information that went astray. The audit process revealed several other devices on the JPL ________________ that system administrators did not know about. None of these other devices was believed to be malicious.

When the ________________ became known about within Nasa, it prompted *(= veranlasste)* some parts of the agency, including the Johnson Space Center, to stop using a core gateway that gave employees and contractors access its other labs and locations. This was done because it was feared the attacker could ________________ their widespread access to get at flight systems controlling currently active spacecraft.

The audit report recommended that Nasa do a better job of monitoring its network and tighten up its hack attack policies.
shortened from BBC.com

4. Malware: multiple choice (6 points)

Choose the best answer to complete each sentence by ringing A, B, C or D.

1. Viruses are programs that spread by ________________ themselves to files or documents.

A: attach **B:** attaching **C:** attached **D:** attachment

2. Worms have the capacity ________________ from one computer to another without human help.

A: that move **B:** to move **C:** moving **D:** to moving

3. Spyware is designed ____________ information from computers for commercial or criminal purposes.

A: collecting **B:** for collection **C:** to collecting **D:** to collect

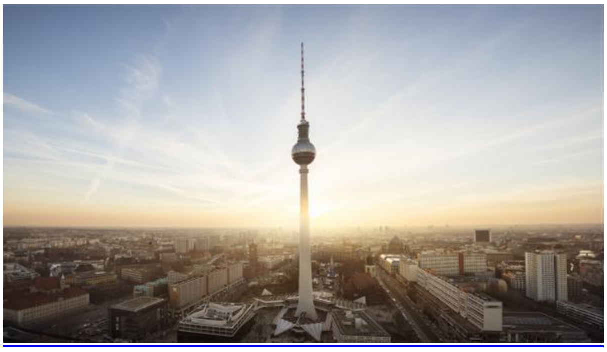
4. A firewall is designed to prevent spyware ________________ access to the internal network.

A: to gain **B:** to gaining **C:** from gaining **D:** gains

5. If you receive an email from an unknown person, _______________ open any attachments. *(2 pts)*

A: don’t **B:** you shouldn’t **C:** it’s best not to **D:** A, B and C

5. Berlin is a Tech Hub, so why are Germany's Internet Speeds so slow? (9 pts)



Berlin's flourishing *(= blühend)* tech scene attracts talent from across the globe. At a start-up incubator in the western part of the city, an international team recently launched an app called SPRT, which connects sports enthusiasts. Amy Cooper, a 20-year-old SPRT employee who moved to Germany from Britain last June, complains that Berlin's Internet speed is so slow, it feels like the old dial-up days she has heard her parents reminisce about. "We're working in a co-working office where there's loads of start-ups, everything's online," Cooper says. "We use it every second of the day, so it's important for us that it works and that it's reliable. And most of the time, it's not, and that can be really frustrating."

Germany is Europe's largest economy, but business leaders warn it is in danger of losing its edge because of sluggish Internet connections. While other countries are thinking about whether to upgrade their cellphone systems to 5G, Germany is still grappling with 3G. A report by Germany's Federal Network Agency last year showed that 29 percent of German Internet users reported Internet speeds of less than half of what was promised by service providers.

Claudia Engfeld of the Berlin Chamber of Commerce and Industry says 70 percent of the city's businesses have complained to her office about slow and inadequate broadband. Engfeld says it's not only an issue for new tech companies, but also for the city's established ‘Mittelstand’ (midsize) engineering firms. "If you are doing 3D printing on an industrial level, you'll need to be fast," Engfeld says. "You can't wait two days till your machine has communicated to the printer to do something. This is a disadvantage that Berlin-based entrepreneurs have in comparison to other cities throughout the world."

The Chamber of Commerce launched an online map tracking where subpar *(= not up to standard)* broadband is affecting businesses in the city. Since last summer, more than 4,000 companies have contributed to the map, pinpointing areas with connectivity problems. Engfeld says in some parts of Berlin, connections are so patchy that companies have had to move or ask staff to work from home, where Internet reliability is greater. Engfeld says having access to a good connection depends on luck, and how far you are from a distribution box.

shortened from bbc.com

Are the following statements based on the text true or false? Mark them clearly with T or F respectively. ***(1 pt. each)***

1. The company Amy Cooper works for cannot get Internet access most of the time. ______

2. Slow Internet connections are mainly a problem for tech companies. ______

3. Working from home is sometimes a better option in Berlin because the Internet connection is faster. ______

Find another word in the text with a very similar meaning for each of the words / expressions below. ***(1 pt. each)***

4. sluggish ______________________
5. subpar ______________________
6. new tech companies ______________________
7. not reliable ______________________

8. Explain the meaning of the following sentence from the text by reformulating it:
"Europe's largest economy is in danger of losing its edge because of sluggish Internet connections" (2 pts)

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6. Writing (10 points)

WRITE a short text – it could be for a blog. Write between 150 and 250 words: you do not need to count the words!

EITHER: a) Comment on this text. You might write about: the importance of the Internet in various aspects of our lives, e.g. work, communication, education, entertainment; high-speed Internet connections: how fast, which technologies, who is responsible? What it might mean for Germany, if Internet connections are slower here than in other countries …

OR b) Comment on the text in Task 1 "Robot combines vision and touch to learn the game of Jenga". You might focus, for example, on the idea of the robot described and the AI involved; on the roles robots play in today's world or might play in the future; on other uses of AI you know about …

In either a) or b), refer to the text in question but also include your own ideas: Points will be given for ideas, structure and expression.

Write your text here and, if necessary, in the space after the chart.

TITLE: